

The Halictidae of the Cape Verde Islands (Hymenoptera Apoidea)

by Alain PAULY, Yuri A. PESENKO and Francisco LA ROCHE

Summary

This paper revises the material of Halictid bees recently collected in Cape Verde Islands. Six species were identified: *Halictus (Seladonia) lucidipennis* SMITH, 1853, *Sphecodes capverdensis* n.sp., *Nomioides* aff. *minutissimus* (ROSSI, 1790), *Ceylalictus (Ceylalictus) punjabensis* (CAMERON, 1907), *Ceylalictus (Atronomioides) capverdensis* n.sp. and *C. (Atronomioides) grandior* n.sp. The new species are endemic. The distribution of *H. (S.) lucidipennis* is mapped. Flowers visited by Halictids in Cape Verde Islands are listed.

Résumé

Cet article révisé le matériel de Halictidae récemment collecté aux Iles du Cap Vert. Six espèces sont identifiées: *Halictus (Seladonia) lucidipennis* SMITH, 1853, *Sphecodes capverdensis* n.sp., *Nomioides* aff. *minutissimus* (ROSSI, 1790), *Ceylalictus (Ceylalictus) punjabensis* (CAMERON, 1907), *Ceylalictus (Atronomioides) capverdensis* n.sp. and *C. (Atronomioides) grandior* n.sp. Les nouvelles espèces sont endémiques. Une carte de distribution de *H. (S.) lucidipennis* est présentée. Les fleurs visitées par les Halictidae aux Iles du Cap Vert sont citées.

Resumen

Este artículo es una revisión de las abejas de la familia de los halictidos recolectadas en estos últimos años en el archipiélago de Cabo Verde. Se han identificado seis especies: *Halictus (Seladonia) lucidipennis* SMITH, 1853, *Sphecodes capverdensis* n.sp., *Nomioides* aff. *minutissimus* (ROSSI, 1790), *Ceylalictus (Ceylalictus) punjabensis* (CAMERON, 1907), *Ceylalictus (Atronomioides) capverdensis* n.sp. y *C. (Atronomioides) grandior* n.sp. Las tres nuevas especies que se describen son endémicas. Se incluye un mapa de distribución mundial de *H. (S.) lucidipennis* y se citan las flores visitadas por estas especies de halictidos.

Introduction

The Apoidea from the Cape Verde Islands were first recorded by GROH (1982) and SIMON THOMAS & WIERING (1993). However, in those papers, the halictid bees were provided only generic names or were incorrectly named, except for one species: *Halictus (Seladonia) varipes* (now a synonym of *H. lucidipennis* SMITH, 1853). More recently, in 1998 and 1999, extensive additional material on bees was collected in the Cape Verde Islands by one of us (F. LA ROCHE). The present paper contains results of a

study of the material, which includes six species. Three unexpected new species are endemic.

The distribution map of *Halictus (Seladonia) lucidipennis* was produced by the softwares *DFP* and *CFF* (BARBIER & RASMONT, 2000, BARBIER et al. 2000).

Collections and acronyms:

HOLZEL, LÖBIN, OHM: Senckenberg Museum (= SM)

SIMON THOMAS et VAN HARTEN: Zoologisch Museum Amsterdam (= ZMA)

LAROCHE: col. LAROCHE & Museo Insular de Ciencias Naturales de Tenerife (= MT)

Institut royal des Sciences naturelles de Belgique (= IRSNB)

Zoological Institute, Russian Academy of Sciences, St Petersburg (= ZISP)

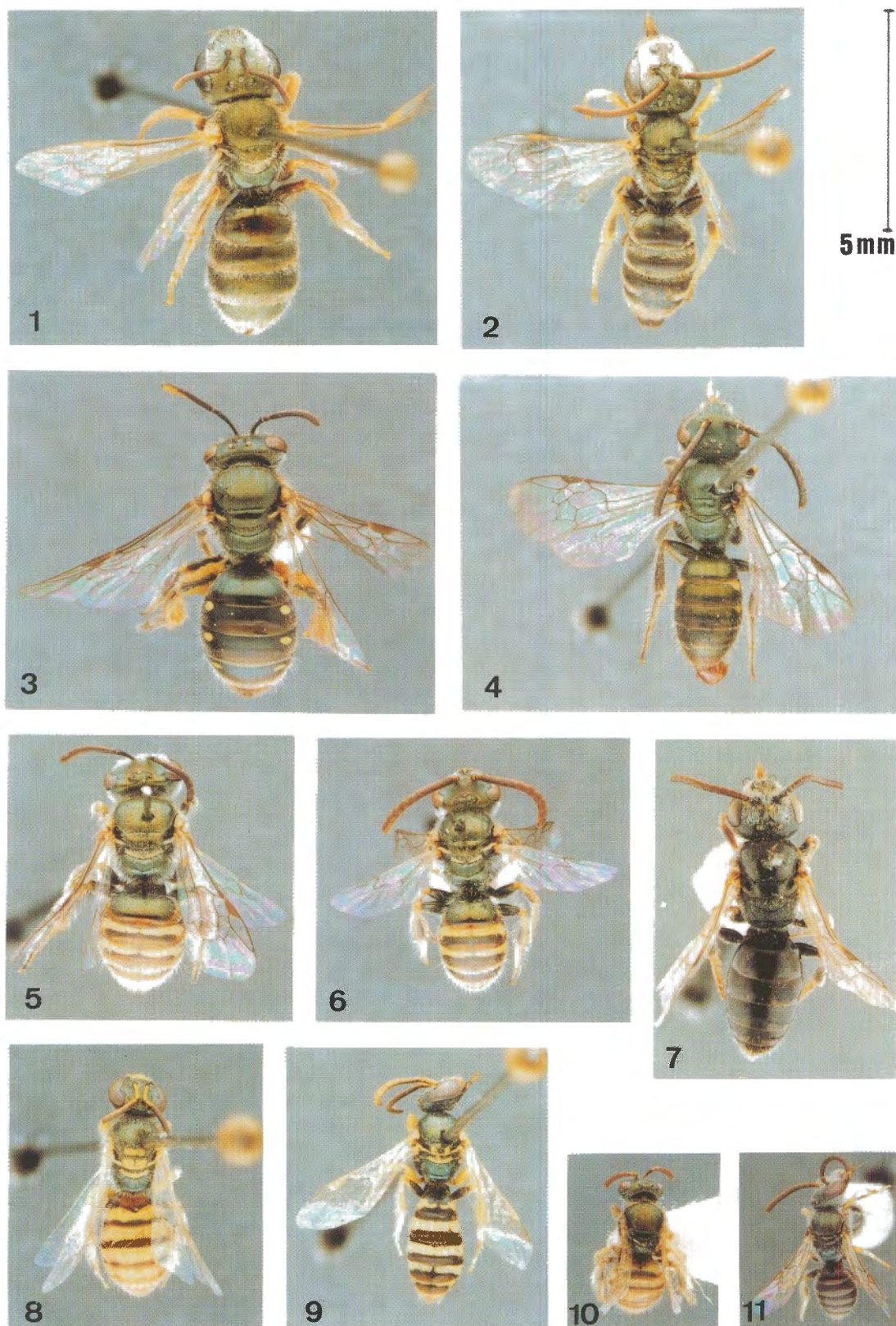
Halictus (Seladonia) lucidipennis SMITH, 1853 (Figs. 1, 2, 12, 13, 14, 24)

Synonyms: *Halictus varipes* MORAWITZ 1876; *Halictus vernalis* SMITH, 1879; *Halictus niloticus* SMITH, 1879; *Halictus magretti* VACHAL, 1892; *Halictus dives* PÉREZ, 1895; *Halictus omanicus* PÉREZ, 1907; *Halictus variipes* var. *koptica* BLÜTHGEN, 1933; *Halictus (Seladonia) sudanicus* COCKERELL, 1945; *Halictus (Seladonia) tokarensis* COCKERELL, 1945; *Halictus (Seladonia) dissensis* COCKERELL, 1945; *Halictus (Seladonia) medanicus* COCKERELL, 1945; *Halictus (Seladonia) mogrensis* COCKERELL, 1945; *Halictus (Seladonia) tokariellus* COCKERELL, 1945; *Halictus (Seladonia) medaniellus* COCKERELL, 1945; *Halictus (Seladonia) morinellus hyemalus* WARNCKE, 1982.

Remark: The *Halictus (Seladonia)* sp. A of SIMON THOMAS & WIERING (1993) is *H. lucidipennis* male (macrocephalic form, fig. 13).

H. varipes has been placed as a synonym of *H. lucidipennis* by SAKAGAMI & EBMER (1987), followed by PAULY (1999).

Distribution (map fig. 12): Morocco, Algeria, Tunisia, Libya, Egypt, Cape Verde, Senegal, Gambia, Mali, Bur-



Figs. 1-11 — Habitus of the six Halictid species recorded from the Cape Verde Islands. 1-2, *Halictus (Seladonia) lucidipennis*, female (Santiago) and male (São Vicente). 3-4, *Ceylalicthus (Meganomioides) capverdensis*, female holotype (Fogo) and male (Santo Antão). 5-6, *Ceylalicthus (Meganomioides) grandior*, female holotype (Sal) and male (Sal). 7, *Sphecodes capverdensis*, male holotype. 8-9, *Ceylalicthus punjabensis*, female (Santiago) and male (Sal). 10-11, *Nomiooides* aff. *minutissimus*, female (Santa Luzia) and male (Fogo).

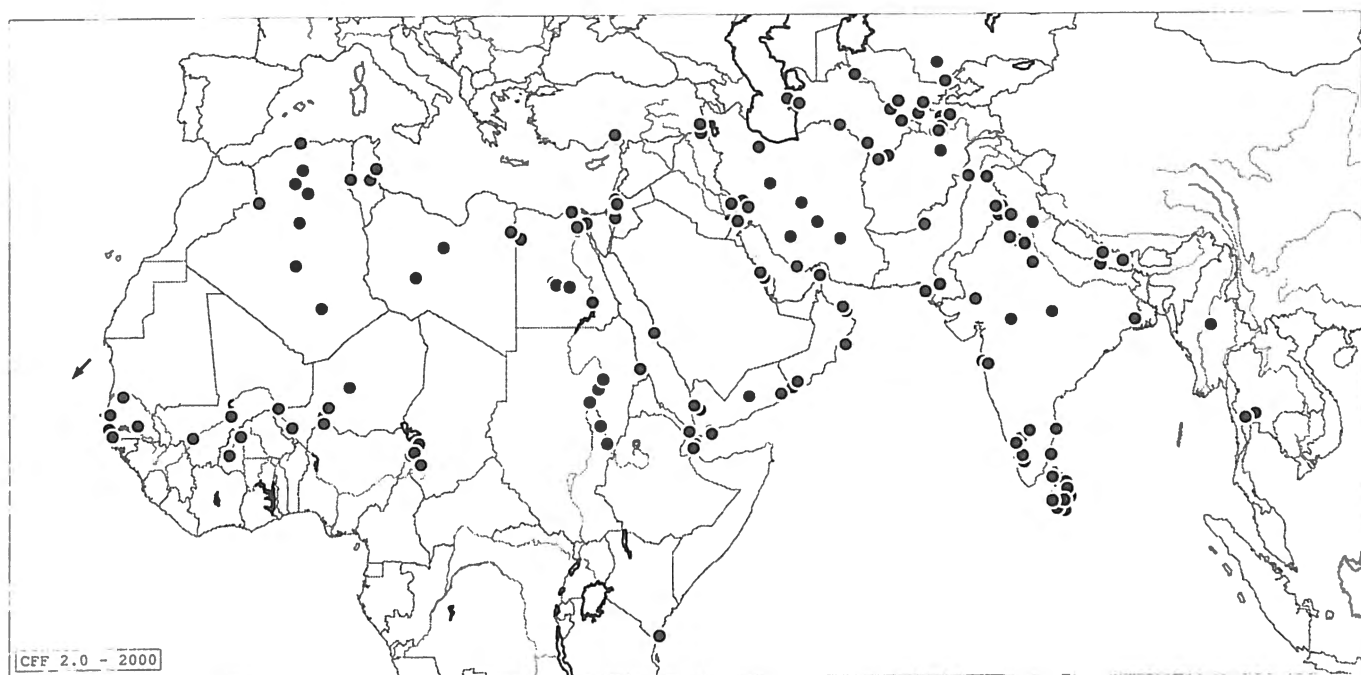


Fig. 12 — Distribution map of *Halictus (Seladonia) lucidipennis*.

kina-Faso, Niger, N. Cameroon, Chad, Sudan, Eritrea, Ethiopia, Djibouti, Kenya, Yemen, Arabia, Oman, SE Turkey, Israel, Jordan, Iraq, Iran, Turkmenia, Uzbekistan, Tajikistan, Kyrgyzstan*, Kazakhstan*, Afghanistan, Pakistan, India, Sri Lanka, Nepal, Bhutan*, Burma, N. Thailand, China (Yunnan*). [* P.A.W. Ebmer, commun. pers.; not mapped]

Material examined. Cape Verde Islands: Santo Antão: Porto Novo, *Prosopis*, 25.xi.1980, 1♂ (Hölzel, Lobin, Ohm).

São Vicente: Mte Verde, 8.xi.1980, 1♀ (Hölzel, Lobin, Ohm); Stadt Vaud Rudesme, 7.xi.1980, 1♀ (Hölzel, Lobin, Ohm); Ruderal, 7.xi.1980, 1♀, 1♂ (Hölzel, Lobin, Ohm), 21.xii.1978, 1♀, 1♂ (Lobin); near Mindelo, 7-9.xi, 25-26.xi.1980, 1♂ (Hölzel, Lobin, Ohm); Mindelo, 4.xi.1988, 18♂ (Simon Thomas); São Pedro, 12.x.1998 (1), 1♀ (La Roche); Parque Eólico, 12.x.1998 (4), 1♀, 2♂ (La Roche).

Santa Luzia: Bco. de las casas, 1.x.1998 (8), 1♂ (La Roche).

São Nicolau: x.1979, 1♀ (Groh, Lobin); Estanzia Bras, 29.xi.1980, 1♀ (Hölzel, Lobin, Ohm); Morro Bras, 13.x.1998 (5), 2♀ (La Roche).

Sal: Santa Maria, 3.xi.1988, 8♀ (Simon Thomas); Salinas de Pedra da Lume, 15.xi.1988, 1♀ (Simon Thomas); Espargos, 16.xi.1988, 6♀ (Simon Thomas).

Boa Vista: Santa Monica, 7.x.1998 (7, 9), 4♀, 3♂ (La Roche); Ribeira do Rabil, 7.x.1998 (4), 1♂ (La Roche).

Santiago: S. Martinho Grande, 12.xi.1988, 8♀ (Simon Thomas); Cicade Velha, 13.xi.1988, 4♀ (Simon Thomas); São Jorge, ii.1985, 1♀, 28.iii.1985, 3♀, 1986, 22♀, 2♂,

viii.1988, 1♀, ix.1989, 1♀, i-v.1990, 5♀, 4♂ (van Harten); Tarrafal, x.1979, 4♀, 1♂ (Groh, Lobin); Praia, 3.x.1998 (2), 1♀ (La Roche).

Fogo: S. Filipe, 24.x.1979, 1♀ (Groh, Lobin); Chã das Caldeiras, 30.x.1979, 1♂ (Groh, Lobin); Baia do Corvo, 16.iii.1999 (1), 1♀ (La Roche).

Visited flowers: *Commicarpus helenae*, *Heliotropium ramosissimum*, *Polycarpea nivea*, *Sesubium portulacastrum*, *Tamarix senegalensis*, *Zygophyllum simplex*.

***Sphecodes capverdensis* PAULY & LA ROCHE n. sp.**
(Figs. 7, 15-18, 19, 25)

Diagnosis. A small black finely punctate species, propodeum with fine carina.

Male. *Structure*. Length 7 mm; forewing length 5,5 mm. Head wider than long ($L/l = 0,9$) (Fig. 15). Eyes converging below: upper and lower interorbital distance = $5/4$. Flagellum with first segment broader than long, second 1,5 times as long as broad. Flagellomeres not very constricted. Labrum with basal elevation. Mandible simple. Dorsal area of propodeum as long as metanotum. Hamuli 5. Genitalia (Fig. 19): gonocoxite with dorsal depression.

Sculpture. Vertex with rather fine punctures mixed with very fine punctures. Genae finely rugose. Mesoscutum (Fig. 17) sparsely and rather finely punctate, spaces between punctures smooth and with some minute punctures, punctures separated by two puncture diameters. Sides of mesosoma roughened. Basal area of propodeum

with fine irregular carinae, connected by numerous transverse carinae (Fig. 18). Terga 1-3 with rather dense punctures, polished, impunctate on posterior margins (Fig. 16). Base of tergum 2 not depressed.

Coloration. Black, following parts pale yellow: mandible (apex brown), all tarsi, knees, tegula, axillary sclerites veins and stigma of wings. Wings transparent. Under surface of flagellum ochre.

Vestiture. Hairs of head snowy-white and plumose hiding totality of face (Fig. 15). Mesoscutum with short and rather numerous hairs. Sides of mesosoma with rather numerous and plumose hairs. Propodeum with few plumose hairs on sides, posterior face glabrous. Metasoma nearly glabrous, dorsal hairs almost absent except for on terga 5 and 6.

Female. Not known.

Holotype: 1♂, Cape Verde Islands, Boa Vista, Santa Monica, 7.x.1998 (7), on *Tamarix senegalensis* (La Roche; MT).

***Nomioides* aff. *minutissimus* (ROSSI, 1790)**

(Figs. 10, 11, 26)

Formally this species may be named as *Nomioides minutissimus* s. l. (in understanding of PESENKO, 1983). However, this group need a new approach. The species of this group from Cape Verde differs from the typical *N. minutissimus* in shorter head and richer tomentose pubescence of both sexes and in shorter flagellomeres in the

male. This species is rather *N. deceptor* SAUNDERS, 1908, but differs from the typical *N. deceptor* in poorer yellow pattern. The most right decision will be possible in a monograph on the African Nomioidinae (PESENKO & PAULY in prep.)

Distribution. *N. minutissimus* s. l. is a widely distributed west Palaearctic species group, occurring from Canary Islands (ssp. *canariensis* BLÜTHGEN), to Mongolia, northern India and northern China (PESENKO, 1983, map fig. 166; PESENKO *et al.*, 2000).

Material examined: Cape Verde Islands. São Vicente: São Pedro, 12.x.1998 (1), 2♀, 1♂ (La Roche).

Santa Luzia: Ilheu Branco, 11.x.1998 (20), 1♂ (La Roche); Bco. de las casas, 11.x.1998 (8), 1♀, 2♂ (La Roche); Praia do Porto, 11.x.1998 (7), 2♀ (La Roche).

Sal: Santa Maria, 3.xi.1988, 1♀, 1♂ (Simon Thomas), 8.x.1998 (2), 2♀, 1♂ (La Roche).

Boa Vista: Santa Monica, 7.x.1998 (7, 9), 4♀, 8♂ (La Roche).

Maio: Morrinho, 6.x.1998 (5), 1♀ (La Roche).

Santiago: Praia, 3.x.1998 (2, 7), 2♂, 2♀ (La Roche).

Fogo: Costa Bombardeiros, 23.iii.1999 (3), 2♀, 1♂ (La Roche).

Visited flowers: *Commicarpus helenae*, *Heliotropium ramosissimum*, *Polycarpaea nivea*, *Prosopis juliflora*, *Seesubium portulacastrum*, *Tamarix senegalensis*, *Zygophyllum simplex*.

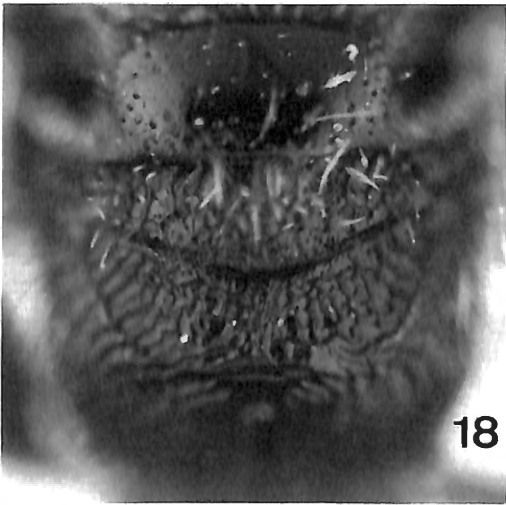
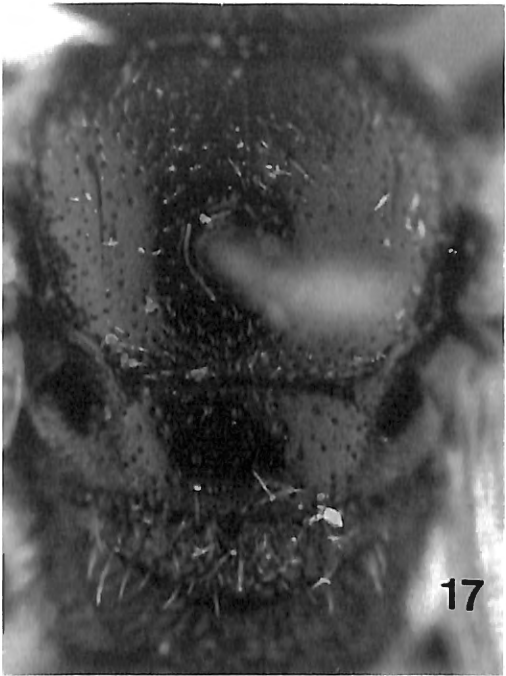
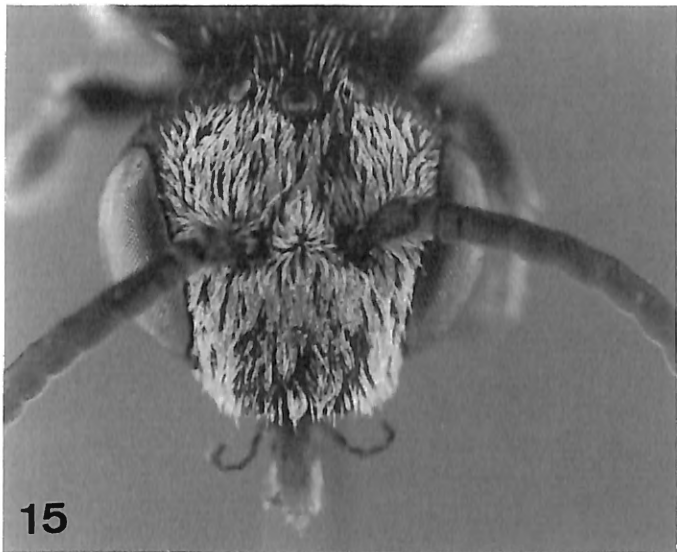


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Figs. 13-14 — Heads of *Halictus* (*Seladonia*) *lucidipennis* males, macrocephalic and normal form (São Vicente), magnified to same scale.



Figs. 15-18 — *Sphecodes capverdensis*, male holotype. 15, Head. 16, Metasoma. 17, Mesosoma. 18, Scutellum, metanotum and propodeum.

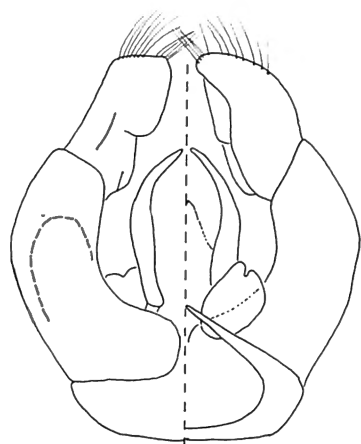


Fig. 19 — Genitalia of *Sphecodes capverdensis*, male holotype (dorsal view on the left).

***Ceylalictus (Ceylalictus) punjabensis* (CAMERON, 1907)**
(Figs. 8, 9, 27)

“*Nomioides variegatus*”; SIMON THOMAS & WIERING, 1993.

Distribution. North Africa, Arabia, Near East, SE Iran, S. Afghanistan, S. Pakistan, NW India (PESENKO & WARNCKE, 1987).

Material examined. Cape Verde Islands. Sal: Santa Maria, 3.xi.1988, 1♂ (Simon Thomas).

Boa Vista: Santa Monica, 7.x.1998 (7), 5♂ (La Roche). Santiago: Cidade Velha, 13.xi.1988, 1♀ (Simon Thomas). Fogo: Costa Bombardeiros, 23.iii.1999 (3), 1♂ (La Roche).

Visited flowers: *Prosopis juliflora*, *Tamarix senegalensis*.

New data outside area. Algeria. Hoggar, In Amguel, Oued Tekouiat, 21.VIII.1987, *Tamarix*, 43♂ (A. Pauly); Hoggar, Tit, Oued Amded, 21.VIII.1987, *Tamarix*, 19♂ 2♀ (A. Pauly); Laghouat, 25.VIII.1987, *Tamarix*, 6♂ (A. Pauly); Djelfa, 25.VIII.1987, 1♀ (A. Pauly).

***Ceylalictus (Atronomioides) capverdensis* PESENKO, PAULY & LA ROCHE n. sp.**
(Figs. 3, 4, 20, 21, 28)

Diagnosis. The new species is a member of the subgenus *Atronomioides* PESENKO, 1983, which includes 10 species described hitherto and is a Palaeotropical taxon in its occurrence. This species occupies an isolated position in the subgenus by its bigger and relatively broader body (especially in female) and combination of other characters. It shares the metallic green coloration of the head and mesosoma only with the South African *C. halictoides*

(BLÜTHGEN, 1925), two Oriental species and *C. grandior* sp. n. described below.

Male: *Structure*. Length 5.0–5.5 mm. Body length / maximal width (of head) ratio 3. Head flattened, roundly triangular in frontal view, with projecting vertex; about as high as wide (Fig. 21). Face flat, with slight shallow depression between antennal sockets. Ocellar elevation distinct. Medial clypeal lobe flat (in lateral view), about as high as wide. Clypeus projecting about a half of its height below lower margins of eyes. Supraclypeal area flat, provided with small sharp tubercle before upper border. Malar space linear. Inner orbit with deep triangular notch; its depth about 0.5 of maximal (extrapolated) ocular width in frontal view (Fig. 21); paraocular area in the notch flat. Longitudinal carina between antennal sockets and frontal line absent. Mandibles bidentate. Antennae relatively long, reaching the middle of dorsal surface of propodeum. First flagellomere half as long as its diameter; 2nd–7th flagellomeres 1.5 times as long as wide. Scutellum convex. Metapostnotum not defined. Dorsal surface of propodeum flat, widely rounded in lateral and posterior margins, equal to scutellum in length. Marginal cell of forewing relatively narrow, narrowly truncated at distal end; second submarginal cell trapezoidal. Hind wings with seven distal hamuli on anterior margin. Metasoma moderately convex, elongate elliptic, 1.8–2.0 times as long as wide. Terga flattened, their posterior area relatively narrow, slightly separated from tergal discs (postgradular areas), only posterior area of tergum 1 distinctly depressed. Sclerotised part of metasomal sternum 8 in form of triangle star with very narrow and long axes, lateral axes twice longer than anterior median one. Genital foramen roundly triangular, somewhat longer than wide. Median gonobasal suture absent. Unlike other species of the subgenus, both ventral bridges not broadened medially: ventral gonobasal bridge entirely narrow, ventral gonocoxal bridge sharply narrowed medially; the latter situated directly above gonobasal one. Volsellae provided with long lobe directed backward and flattened laterally, reaching the pennial valves. Gonoforceps relatively narrow, nearly parallel-sided, directed ventrally in distal third, provided with strong longitudinal dorsal carina, longitudinal row of bristles and apical fringe, obliquely truncated at apex.

Sculpture. Face, vertex and genal areas on lower half uniformly, very densely and finely granulate, impunctate, mat or silky mat; genal area on upper part obscurely indistinctly and very finely punctate, shiny. Mesoscutum, lateral sides of mesosoma and propodeum uniformly densely granulate (each granola subequal to eye facet), mat. Scutellum on disc obscurely granulate, silk-shiny. Dorsal surface of propodeum provided with short fine longitudinal carinae at anterior margin. Metasomal terga obscurely granulate, silk-shiny; their posterior areas very finely striate.

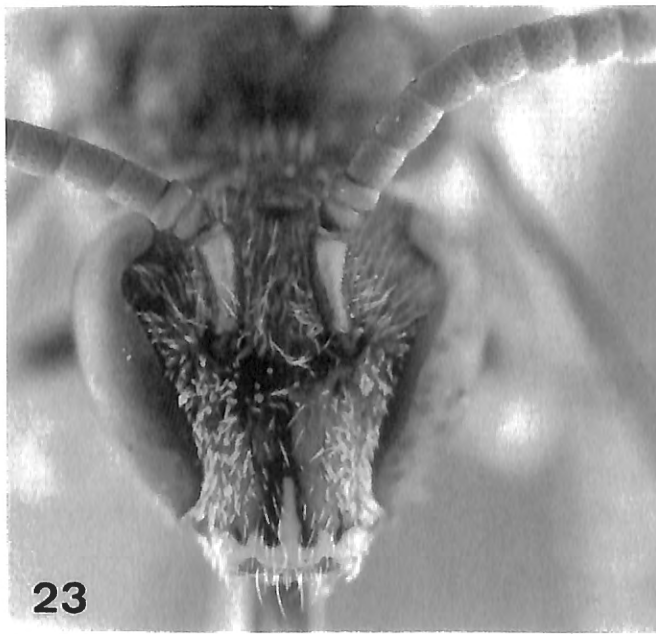
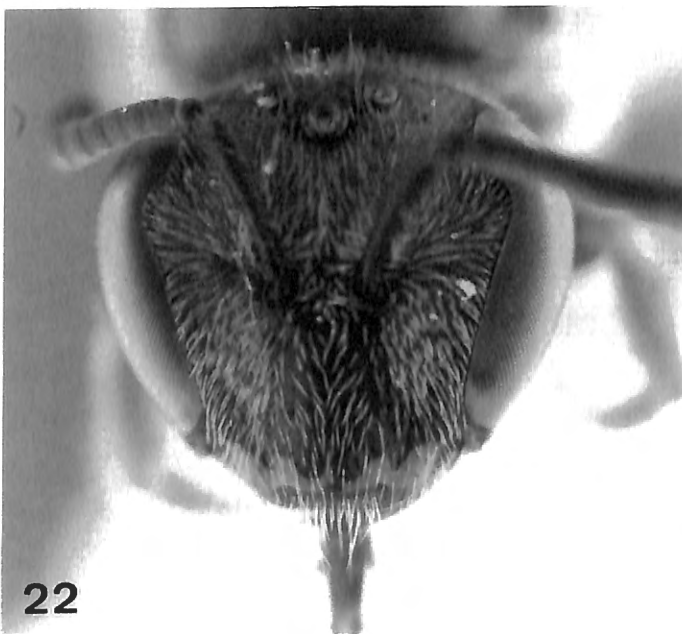
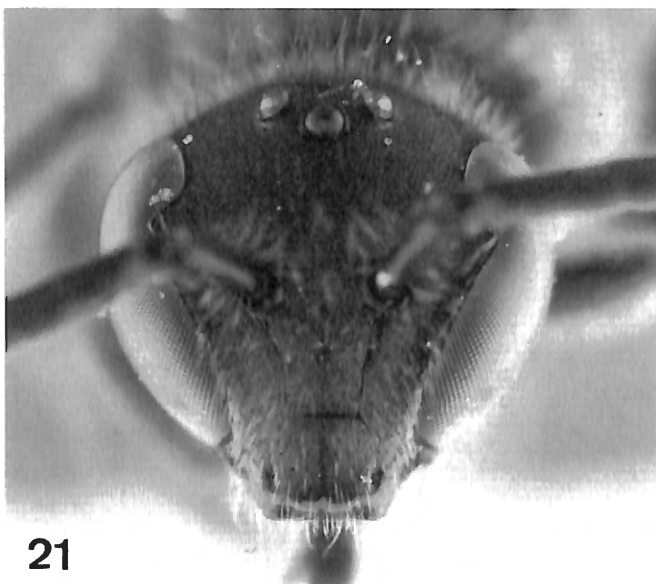
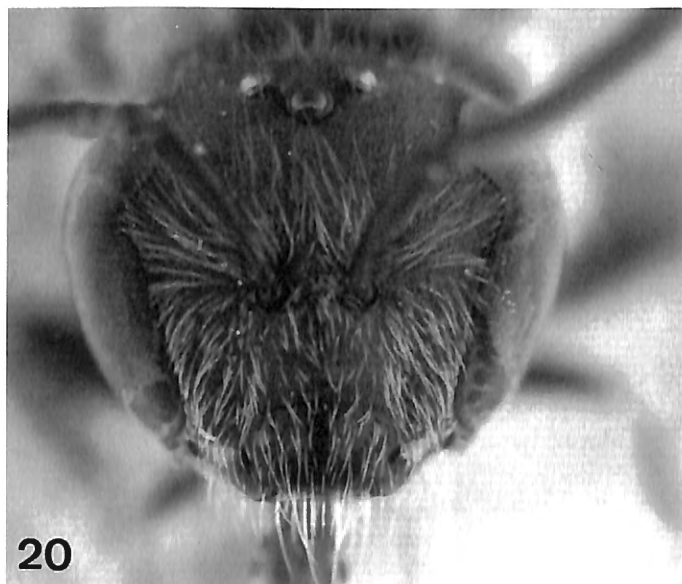
Coloration. Head and mesosoma dull metallic dark green; labrum, mandibles, lateral lobes of clypeus, strip along lower margin of medial lobe of clypeus (Fig. 21) or

pattern similar to that in *C. grandior* sp. n. (see Fig. 23), and scutellar crests, all yellow. Antennal scapus black, with yellow longitudinal narrow strip on lower side; flagellum brown on upper side and ochre-yellow on lower side. Legs brownish black, except for dark yellow tarsi and partly tibiae. Tegula fuscous, translucent in posterior half. Wing membrane infuscated; pterostigma and veins brown. Metasoma blackish brown; tergum 1 on disc with green metallic tint; posterior areas of terga horny translucent. Terga 2-4 with small lateral yellow spots connected by narrow transverse yellow along tergal graduli appearing through translucent posterior areas of preceding terga (Fig. 4).

Vestiture. Whitish, relatively short, not dense, erect, slightly plumose on most surfaces. Mesoscutum, scutel-

lum, and metanotum covered with denser, brownish hairs. Adpressed plumose and tomentose pubescence absent.

Female: Structure. Length 6.0-6.5 mm. Body relatively wide: length / maximal width (at posterior margin of metasomal tergum 2) ratio 2.5-2.7. Head flattened, triangularly rounded in frontal view; its height / width ratio 0.85-0.9 (Fig. 20). Face flat, with weak transverse depression at upper margins of antennal sockets. Ocellar elevation distinct. Medial clypeal lobe flat, 0.7-0.8 times as high as wide. Clypeus projecting half of its height below lower margins of eyes. Supraclypeal area flat. Malar space linear. Inner orbit with deep triangular notch; its depth about 0.4 of maximal (extrapolated) ocular width in frontal view (Fig. 20); paraocular area in the notch flat. Longitudinal carina between antennal sockets absent or



Figs. 20-23 — Heads of *Ceylalictus*. 20-21, *C. capverdensis*, female (Fogo) and male (São Nicolau). 22-23, *C. grandior*, female (Sal) and male (Sal).

present in form of indistinct shiny elevation. Frontal line absent. Mandible with subapical tooth. Scutellum slightly convex. Structure of propodeum and wing venation similar to those in male. Inner metatibial spur with three teeth. Metasoma moderately convex, widely elliptic, about 1.5 times as long as wide (Fig. 3); terga flattened, their posterior marginal areas relatively narrow, separated from tergal discs by shallow depressions.

Sculpture. Face and vertex uniformly, very densely and finely granulate, impunctate, mat or silky mat; clypeus and lower part of paraocular area provided with sparse shallow punctures (diameters 25-30 μ) on granulate background; clypeus with shiny smooth strip along lower margin. Sculpture of genal area, and mesosoma similar to that in male. Metasomal tergum 1 granulate similar to mesoscutum, sometimes the tergum a little shiner; on subsequent terga and posterior area of tergum 1, granulation dense fine transverse striation.

Coloration. Head and mesosoma dull metallic dark green; labrum, mandibles, lateral lobes of clypeus, small lateral spots on medial lobe of clypeus (Fig. 20), and scutellar crests, all dark or brownish yellow. Antennal scapus black, flagellum brown on upper side and ochre-yellow on lower side. Legs black, except for the following dark yellow parts: most anterior surface of fore tibia, distal end of fore and middle femora. Coloration of tegulae and wings similar to that in male. Metasomal tergum 1 dull metallic dark green; subsequent terga blackish brown, sometimes with slight metallic green tint; posterior areas of terga horny translucent. Terga 2-4 with small lateral yellow spots (Fig. 3).

Vestiture. Dark brownish, erect, mostly plumose. Only propodeum covered with paler hairs. Apressed plumose and tomentose pubescence absent.

This species was recorded by GROH (1982) as "22 idet. Ind., aff *Zonalictus* (wahrscheinlich Gen. nov.) (mind. 2 Arten)". It is recorded as *Nomioides* sp. B by SIMON-THOMAS & WIERING (1993). To be noted that the labels "sp. A" and "sp. B" were reversed by WIERING.

Distribution (Fig. 28). An endemic species. North-western islands (Santo Antão, São Vicente, Santa Luzia, São Nicolau) and Fogo.

Holotype: 1♀, Cape Verde Islands, Fogo, Caldeira, Monte Cruz, 10.iii.1999 (1) (La Roche).

Paratypes. Cape Verde Islands. Santo Antão: Cova, 17.vii.1988, 3♀, 6.ix.1988, 1♀ (van Harten), 6.xi.1988, 9♀, 9♂ (Simon Thomas); Paul, 9.viii.1989, 1♂ (van Harten); Alto Mira, 18, 19.xi.1980, 1♀, 1♂ (Hölzel, Lobin, Ohm); Supra Porto Novo, 24.xi.1980, 3♀, 5♂ (Hölzel, Lobin, Ohm); Supra Cova, 12.xi.1980, 1♀ (Hölzel, Lobin, Ohm); Rib. Da Torre, 11.xi.1980, 4♂ (Hölzel, Lobin, Ohm).

São Vicente: Mindelo, 4.xi.1988, 4♂ (Simon Thomas); Parque Eólico, 12.x.1998 (4), 1♀ (La Roche).

Santa Luzia: Ilheu Branco, 11.x.1998 (20), 3♂ (La Roche).

São Nicolau: Preguiça, 9.vi.1986, 1♂; Estanzia Bras, 29.xi.1980, 1♀ (Hölzel, Lobin, Ohm); Caldeira, 13.x.1998 (3), 1♂, 1♀ (La Roche).

Fogo: Chã das Caldeiras, 18.iii.1999 (1, 5), 4♂ (La Roche); Bordeira Sur, 24.iii.1999 (4), 1♂ (La Roche); Altos do Portela, 9.iii.1999 (8), 2♂ (La Roche); Caldeira, Monte Cruz, 10.iii.1999 (1), 4♀ (La Roche); Bangaeira, 14.iii.1999 (6), 1♀ (La Roche); Mte Velho Piorno, 22.iii.1999 (3), 1♀ (La Roche).

Holotype in MT. **Paratypes:** ZMA, ZISP, IRSNB.

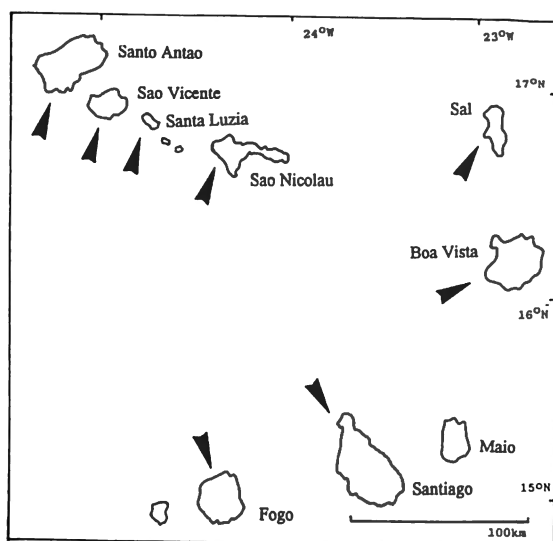
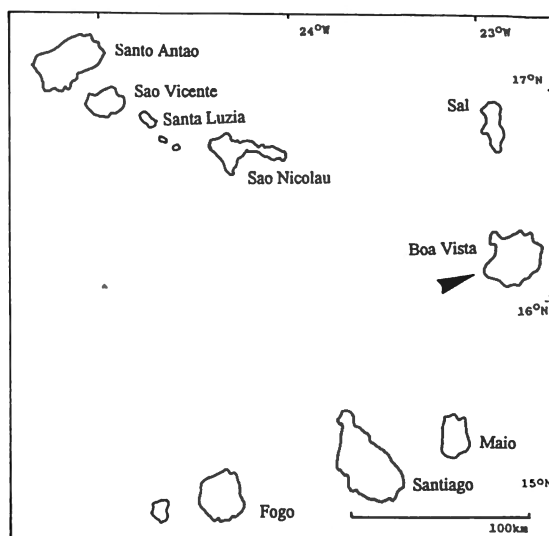
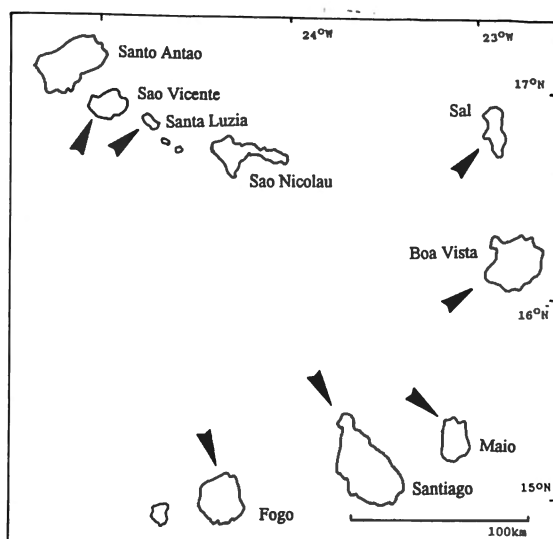
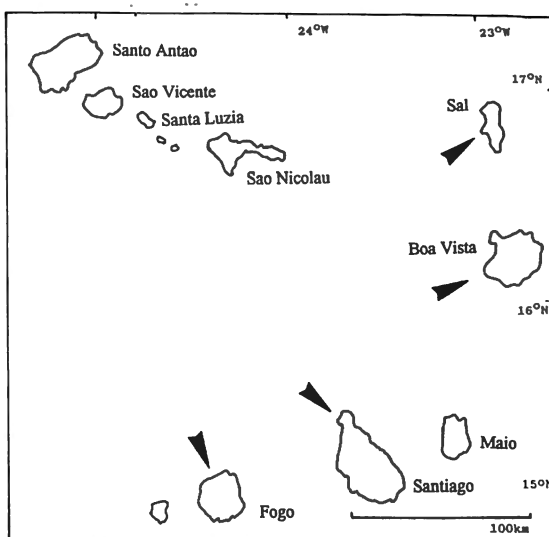
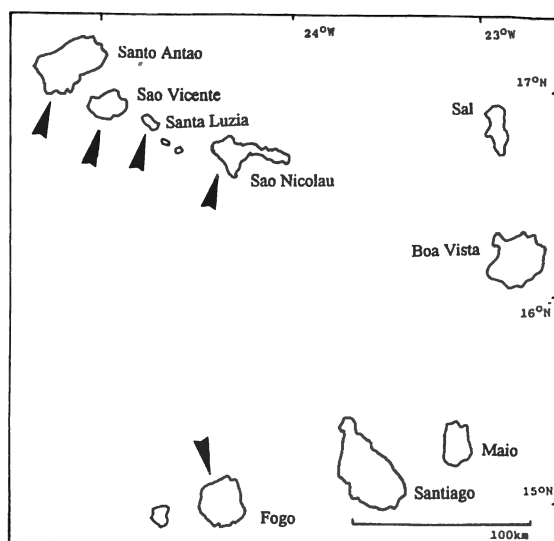
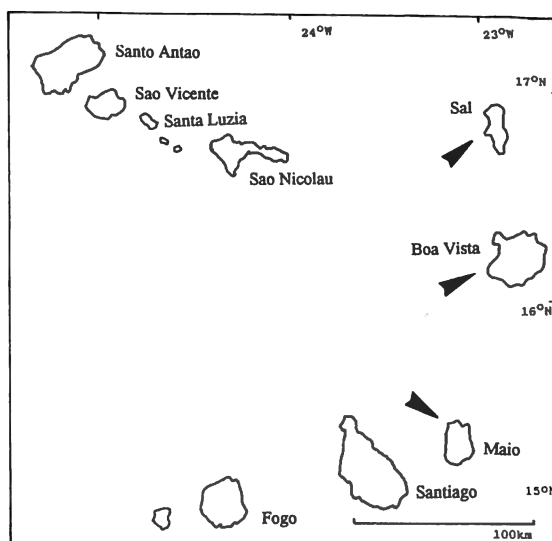
Visited flowers. *Cajanus cajan*, *Echium stenosphon*, *Heliotropium ramosissimum*, *Lavandula rotundifolia*, *Polycarpaea gayi*, *Satureja forbesii*, *Zygophyllum simplex*.

***Ceylalicus (Atronomioides) grandior* PESENKO, PAULY & LA ROCHE n. sp.**

(Figs. 5, 6, 22, 23, 29)

Diagnosis. This is also a member of the subgenus *Atronomioides*. It is similar to *C. halictoides* (BLÜTHGEN, 1925) in the body coloration of the female, but differs in the body size and sculpture of both sexes and the coloration of the male body and structure of the male genitalia.

Male: Structure. Length 5.0-5.5 mm. Head flattened, nearly triangular in frontal view, 1.04-1.06 times as high as wide (Fig. 23). Face weakly convex, not impressed at level of antennal sockets. Ocellar elevation distinct. Medial clypeal lobe straight (in lateral view), convex in dorsal view to head, somewhat higher than wide. Clypeus projecting about 0.75 of its height below lower margin of eyes. Supraclypeal area flat, usually provided with weak, but distinct rounded median tubercle. Malar space linear. Inner orbit with deep rounded notch; its depth about 0.6 of maximal (extrapolated) ocular width in frontal view (Fig. 23); paraocular area in the notch flat. Longitudinal carina between antennal sockets absent. Frontal line indistinct. Mandible with subapical tooth. Antennae moderately long, reaching the propodeum. First flagellomere 0.4 times as long as wide; 2nd-7th flagellomeres approximately as long as wide. Scutellum convex. Metapostnotum badly defined. Dorsal surface of propodeum slightly transversely concave, at lateral and posterior margins narrowly rounded, forming with posterior vertical surface of propodeum an angle of about 130°; 0.75-0.8 times as long as scutellum. Marginal cell of forewing relatively long, narrowly truncated at distal end; second submarginal cell triangular or nearly so. Hind wings with six distal hamuli on anterior margin. Metasoma convex, elongate elliptic in dorsal view, 1.5-1.7 times as long as wide. Discs (postgradular areas) of terga 2-4 weakly, but distinctly convex. Posterior areas of terga relatively narrow, flattened, distinctly separated from tergal discs. Structure of metasomal sternum 8 similar to that in *C. aldabranus* (COCKERELL, 1912) (see PESENKO, 1996, Fig. 23). Genital capsule similar to that in *C. capverdensis* sp. n. (see above), with some differences: posterior lobe of volsella oriented obliquely (not dorsoventrally); bristles of long-

Fig. 24. *Halictus (Seladonia) lucidipennis*Fig. 25. *Sphecodes capverdensis*Fig. 26. *Nomioides* aff. *minutissimus*Fig. 27. *C. (Ceylactis) punjabensis*Fig. 28. *C. (Atronomioides) capverdensis*Fig. 29. *C. (Atronomioides) grandior*

Figs. 24-29 — Distribution maps of the six Halictid species in Cape Verde Islands.

itudinal series on gonoforceps longer (as long as gonoforceps wide); longitudinal dorsal carina of gonoforceps not so strong and present only on proximal half of gonoforceps; gonoforceps broadly rounded at apex.

Sculpture. Yellow coloured parts of clypeus nearly polished, shiny; its dark part, supraclypeal area and lower half of paraocular area obscurely finely granulate, silkshiny. Frons, upper half of paraocular areas and vertex densely finely granulate, mat to silky mat. Genal area with obscure, fine, sparse punctation, shiny. Mesoscutum and dorsal surface of propodeum densely granulate (each granule subequal to eye facet), silky mat: the latter with narrow polished strip along its posterior margin. Scutellum shiny, except for margins. Sculpture of lateral sides of mesosoma similar to that of frons. Metasoma shiny; tergum 1 very obscurely granulate on disc; posterior areas of terga and discs of terga 2-5 very finely striate.

Coloration. Head and mesosoma dully metallic greenish black or black with distinct dark green tint, excluding the following yellow coloured parts: labrum, mandibles, wavelike pattern on lower third of clypeus and median strip on it, pronotal collar entirely or partly, humeral tubercles (pronotal spiracular lobes), scutellar crests, transverse (sometimes interrupted) band on posterior half of median metanotal sclerite, spots on light brown translucent tegulae. Antennal scapus black, with yellow longitudinal narrow strip on lower side; flagellum brown to light brown on upper side and ochre on lower one. Coxae, trochanters and femora black with distinct metallic green tint; tibiae yellow, with brown to fuscous spots on inner surfaces; tarsi yellow throughout. Wing membrane hyaline; pterostigma and veins fuscous. Tergum 1 black, with metallic green tint; background of terga 2-4 black, without a green tint; posterior areas of terga light horny translucent; terga 5-6 or only tergum 6 orange brown. Yellow pattern of metasoma varying: tergum 1 with lateral spots of various size; terga 2-4 or 2-5 with transverse band on pregradular area, appearing through translucent posterior areas of preceding terga, and with transverse, usually interrupted medially band of various widths on anterior half of discs (postgradular areas); laterally the band widening backward, onto posterior areas of terga; some times both bands on tergum 2 joined together, forming a single wide band.

Vestiture. Whitish, short, not dense, erect, slightly plumose on most surfaces; denser and longer on lower half of face, genal areas, lateral surfaces of mesosoma and anterior surface of tergum 1. Apressed plumose and tomentose pubescence absent.

Female: Structure. Length 5.6-6.4 mm (5.0 in one of paratypes from Santa Maria in the Sal Islands). Body relatively wide: length / maximal width (at posterior margin of metasomal tergum 2) ratio 2.6-2.7. Head flattened, triangularly rounded in frontal view; its height / width ratio 0.85-0.9 (Fig. 22). Face weakly convex, with weak narrow transverse depression between antennal sockets. Ocellar elevation distinct. Medial clypeal lobe flat, about 0.6 times as high as wide. Clypeus projecting 0.6 of its height below lower margin of eyes. Supracly-

peal area very weakly convex, without a tubercle. Malar space linear. Notch in inner orbit similar to that in male (Fig. 22); paraocular area in the notch flat. Longitudinal carina between antennal sockets absent. Frontal line indistinct. Mandible with subapical tooth. Scutellum convex. Structure of propodeum and wing venation similar to those in male, except for trapezoid second submarginal cell in majority of paratypes. Inner metatibial spur with three teeth. Metasoma weakly convex, elliptic heart-shaped in dorsal view; posterior areas of terga wide, flat, not separated from tergal discs, except for tergum 1.

Sculpture and coloration similar to those in male, with some differences: yellow pattern of clypeus poorer (Fig. 5); antennal scapus black throughout; all tibiae and middle and hind tarsi mostly fuscous.

Vestiture. White, short, not dense, erect, slightly plumose on most surfaces; in some paratypes, brown on clypeus and brown, with silver tint, on hind tibia. Apressed plumose and tomentose pubescence absent.

This species was identified as *Nomioides* spec. A. by TIMON THOMAS et WIERING 1993.

Distribution (Fig. 29). An endemic species. *C. grandior* inhabits the eastern islands (Sal, Boavista, Maio) while the closely related species *C. capverdensis* is limited to the western islands.

Holotype: 1♀, Cape Verde Islands, Sal, Santa Maria, 1♀ (La Roche).

Paratypes. Cape Verde Islands. Sal: Santa Maria, 3.xi.1988, 9♀, 4♂ (Simon Thomas), 8.x.1998 (2), 1♀, 3♂ (La Roche); Salinas de Pedra da Lume, 15.xi.1988, 1♂ (Simon Thomas);

Boa Vista: Sal Rei, 20.x.1988, 1♀ (Simon Thomas); Viana, 7.x.1998 (1), 1♂ (La Roche); Santa Monica, 7.x.1998 (7, 9), 1♀, 2♂ (La Roche).

Maio: Morrinho, 6.x.1998 (5), 1♀ (La Roche).

Holotype: MT. **Paratypes:** ZMA, ZISP, IRSNB.

Visited flowers. *Heliotropium ramosissimum*, *Sesubium portulacastrum*, *Tamarix senegalensis*.

Family and plant names with authors

Aizoaceae

Sesubium portulacastrum (L.) L.

Borraginaceae

Echium stenosphon Webb

Heliotropium ramosissimum (Lehm.) DC.

Caryophyllaceae

Polycarpaea nivea Webb

Polycarpaea gayi Webb

Fabaceae

Cajanus cajan (L.) Millsp.

Lamiaceae

Lavandula rotundifolia Benth

Micromeria forbesii Benth

Mimosaceae

Prosopis juliflora (Sw.) DC.

Nyctaginaceae

Commicarpus helenae (J.A. Schult.) Meikle

Tamaricaceae

Tamarix senegalensis DC.

Zygophyllaceae

Zygophyllum simplex L.**List of the other species of Apoidea recorded from the Cape Verde Islands:***Anthophora godefredi* (DOURS, 1869) [*Anthophora modesta* F. SMITH, 1879] (according to BROOKS, 1988; H. WIERING errata 15.xii.1993).*Anthophora modestoides* BROOKS, 1988 [*Anthophora* sp. A of SIMON-THOMAS & WIERING; H. WIERING errata 15.xii.1993]*Anthophora* sp. B (SIMON-THOMAS & WIERING, 1993)*Anthophora* sp. C (SIMON-THOMAS & WIERING, 1993)*Anthophora* sp. D (SIMON-THOMAS & WIERING, 1993)*Thyreus scutellatus* (FABRICIUS, 1781) (SIMON-THOMAS & WIERING, 1993)**References**

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Thyreus sp. aff. *ramosus* (LEPELETIER) (SIMON-THOMAS & WIERING, 1993)*Xylocopa modesta* F. SMITH, 1854 (SIMON-THOMAS & WIERING, 1993)*Megachile (Eutricharaea)* sp. aff. *anatolica* REBMANN, 1967 (SIMON-THOMAS & WIERING, 1993)*Chalicodoma (Callomegachile) rufipennis* (FABRICIUS, 1793) (SIMON-THOMAS & WIERING, 1993)*Apis mellifera* LINNAEUS, 1758 (SIMON-THOMAS & WIERING, 1993)**Acknowledgements**

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